CLAIMS

1. (Original): An electrochemical cell, comprising:

a first electrode;

a second electrode;

a proton exchange membrane disposed between and in intimate contact with the first electrode and the second electrode; and

a pressure pad disposed in electrical communication with the first electrode, the pressure pad comprising an electrically conductive sheet, the sheet having a structure conformable to pressure variations within the cell.

2. (Original): The electrochemical cell of claim 1 wherein the sheet comprises a member having dimples disposed over a surface thereof, the dimples imparting a resilience to the pressure sheet in response to pressure variations across the electrochemical cell.

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3. (Original): The electrochemical cell of claim 2 further comprising an elastomeric member disposed at the dimples.

4. (Original): The electrochemical cell of claim 1 wherein the sheet includes corrugations disposed therein, the corrugations providing a resilience to the pressure pad in response to pressure variations across the electrochemical cell.

5. (Original): The electrochemical cell of claim 4 further comprising an elastomeric member disposed at the corrugations.

6. (Original): The electrochemical cell of claim 5 wherein the elastomeric member is transversely threaded through the corrugations.

7. (Original): An electrochemical cell, comprising:

a first electrode;

a second electrode;

a membrane disposed between the first electrode and the second electrode; and

a pressure pad disposed in electrical communication with the first electrode and being configured to support the first electrode, the second electrode, and the membrane, the pressure pad comprising an electrically conductive compression member.

8. (Original): The electrochemical cell of claim 7 wherein the electrically conductive compression member is a canted coil spring.

9. (Original): The electrochemical cell of claim 7 further comprising a partition member disposed adjacent to the electrically conductive compression member.

10. (Original): The electrochemical cell of claim 7 wherein the electrically conductive compression member is arranged to form a ring.

11. (Original): A resilient pressure pad for an electrochemical cell, the pressure pad comprising:

an electrically conductive planar member; and

a plurality of electrically conductive dimples disposed at a first surface of the planar member, the dimples being configured to impart resilience to the pressure pad in response to pressure variations within the cell.

12. (Original): The pressure pad of claim 11 wherein the dimples are semi-spherical in geometry.

13. (Original): The pressure pad of claim 12 wherein the dimples each comprise a stress point, the stress point defining a point at which the dimples collapse under pressure.

14. (Original): The pressure pad of claim 11 wherein the dimples are frusto-pyramidical in geometry.

15. (Original): The pressure pad of claim 14 further comprising an elastomeric member disposed at the dimples.

16. (Original): The pressure pad of claim 15 wherein the elastomeric member is disposed at the first surface of the planar member adjacent the dimples.

17. (Original): The pressure pad of claim 15 wherein the elastomeric member is disposed at a second surface of the planar member, the second surface of the planar member being defined by an obverse surface of the planar member.

18. (Original): The pressure pad of claim 15 wherein the elastomeric member is disposed within cavities defined by the dimples.

19. (Original): The pressure pad of claim 15 wherein the elastomeric member is a fluorosilicone, a fluoroelastomer, or a combination thereof.

20. (Original): The pressure pad of claim 11 wherein the electrically conductive planar member is copper, silver, gold, chromium, zirconium, tantalum, titanium, niobium, iron, nickel, cobalt, hafnium, tungsten, alloys thereof, electrically conductive carbon, electrically conductive polymer, or combinations of the foregoing materials.

21. (Original): The pressure pad of claim 15 further comprising an elastomeric member threaded through the dimples.

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22. (Original): The pressure pad of claim 11 wherein the pressure pad is disposed in fluid communication with an electrode in the electrochemical cell.

23. (Original): A resilient pressure pad disposed in fluid communication with an electrode in an electrochemical cell, the pressure pad comprising:

an electrically conductive corrugated member.

24. (Original): The pressure pad of claim 23 further comprising an elastomeric member disposed at the corrugated member.

25. (Original): The pressure pad of claim 24 wherein the elastomeric member is positioned to extend longitudinally between two raised portions formed by a raised portion in the corrugated member.

26. (Original): The pressure pad of claim 24 wherein the elastomeric member is threaded transversely through the raised portions in the corrugated member.

27. (Original): The pressure pad of claim 24 wherein the elastomeric member is electrically conductive.

28. (Original): The pressure pad of claim 23 wherein the electrically conductive corrugated member is copper, silver, gold, chromium, zirconium, tantalum, titanium, niobium, iron, nickel, cobalt, hafnium, tungsten, alloys thereof, electrically conductive carbon, an electrically conductive polymeric material, or a combination of the foregoing materials.

29. (Original): The pressure pad of claim 24 wherein the elastomeric member is a fluorosilicone, a fluoroelastomer, or a combination thereof.

30. (Original): A pressure pad for an electrochemical cell, the pressure pad comprising:

an electrically conductive compression member.

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31. (Original): The electrochemical cell of claim 30 wherein the electrically conductive compression member is a canted coil spring.

32. (Original): The electrochemical cell of claim 30 further comprising a partition member disposed adjacent to the electrically conductive compression member.

33. (Original): The electrochemical cell of claim 30 wherein the electrically conductive compression member is arranged to form a ring.

34. (Original): A method of fabricating a resilient pressure pad, comprising:

disposing dimples at an electrically conductive member.

35. (Original): The method of claim 34 wherein the disposing of the dimples at the electrically conductive member comprises stamping the electrically conductive member such that dimples are formed thereon.

36. (Original): The method of claim 34 wherein the disposing of the dimples at the electrically conductive member comprises casting the electrically conductive member such that dimples are formed thereon.

37. (Original): The method of claim 34 further comprising disposing an elastomeric member at the dimples.

38. (Original): The method of claim 37 wherein the disposing of the elastomeric member at the dimples comprises threading the elastomeric member through the dimples.

39. (Original): A method of fabricating a resilient pressure pad, comprising:

disposing corrugations in an electrically conductive member.

40. (Original): The method of claim 39 further comprising disposing an elastomeric member at the corrugations.

41. (Original): The method of claim 40 wherein the disposing of the elastomeric member at the corrugations comprises threading the elastomeric member transversely through the corrugations.

42. (Original): A method of maintaining compression within an electrochemical cell, the method comprising:

disposing an electrically conductive member and a compression member at an electrode of the electrochemical cell;

applying a load at the cell to compress the cell components; and

maintaining electrical communication between the electrode and an external load through the electrically conductive member.

43. (Original): A method of maintaining compression within an electrochemical cell, the method comprising:

disposing a compressible electrically conductive member at an electrode;

applying a load at the cell to compress the cell components; and

maintaining electrical communication between the electrode and an external load through the electrically conductive member.

44. (New): An electrically-conductive compression pad suitable for use in an electrolysis cell stack, said electrically-conductive compression pad comprising:

a single sheet of electrically-conductive material, said single sheet of electrically conductive material having a top surface and a bottom surface; and

elastomeric material arranged on said single sheet of electrically-conductive material in such a way that, when said elastomeric material is compressed, substantially uniform pressure is exerted across each of said top surface and said bottom surface of said single sheet.

45. (New): The electrically-conductive compression pad as claimed in claim 44 wherein said elastomeric material is arranged on each of said top and bottom surfaces of said single sheet and wherein said single sheet of electrically-conductive material is bent to lie flush with said elastomeric material at one or more points on each of said top and bottom surfaces when said elastomeric material is compressed.

46. (New): The electrically-conductive compression pad as claimed in claim 45 wherein said single sheet of electrically-conductive material is a sheet of metal.

47. (New): The electrically-conductive compression pad as claimed in claim 46 wherein said metal is selected from the group consisting of niobium, titanium, zirconium, tantalum, copper, nickel, steel, and hastelloys.

48. (New): The electrically-conductive compression pad as claimed in claim 46 wherein said metal is niobium.

49. (New): The electrically-conductive compression pad as claimed in claim 45 wherein said elastomeric material is a rubber.

50. (New): The electrically-conductive compression pad as claimed in claim 45 wherein said elastomeric material is a silicone.

51. (New): The electrically-conductive compression pad as claimed in claim 45 wherein said single sheet of electrically-conductive material is circular in shape.

52. (New): The electrically-conductive compression pad as claimed in claim 45 wherein said single sheet of electrically-conductive material is rectangular in shape.

53. (New): An electrolysis cell stack comprising:

a first electrolysis cell;

a second electrolysis cell, said second electrolysis cell being arranged in series with said first electrolysis cell; and

the electrically-conductive compression pad of claim 45 interposed between said first electrolysis cell and said second electrolysis cell.

54. (New): An electrolysis cell stack comprising:

a first electrolysis cell;

a second electrolysis cell, said second electrolysis cell being arranged in series with said first electrolysis cell; and

the electrically-conductive compression pad of claim 44 interposed between said first electrolysis cell and said second electrolysis cell.

55. (New): An electrically-conductive compression pad suitable for use in an electrolysis cell stack, said electrically-conductive compression pad comprising:

a single sheet of electrically-conductive material, said single sheet of electrically-conductive material having a top surface and a bottom surface, said single sheet of electrically-conductive material being bent up and down to include a plurality of alternating ribs and channels; and

elastomeric material mounted within said channels, said elastomeric material being dimensioned so that, when said elastomeric material is compressed, said elastomeric material lies flush with said ribs and exerts substantially uniform pressure across each of said top surface and said bottom surface of said single sheet.

56. (New): The electrically-conductive compression pad as claimed in claim 55 wherein said alternating ribs and channels are linear and parallel to one another.

57. (New): The electrically-conductive compression pad as claimed in claim 55 wherein said single sheet of electrically-conductive material is a sheet of metal.

58. (New): The electrically-conductive compression pad as claimed in claim 57 wherein said metal is selected from the group consisting of niobium, titanium, zirconium, tantalum, copper, nickel, steel and hastelloys.

59. (New): The electrically-conductive compression pad as claimed in claim 57 wherein said metal is niobium.

60. (New): The electrically-conductive compression pad as claimed in claim 55 wherein said elastomeric material is a rubber.

61. (New): The electrically-conductive compression pad as claimed in claim 55 wherein said elastomeric material is a silicone.

62. (New): The electrically-conductive compression pad as claimed in claim 55 wherein said single sheet of electrically-conductive material is circular in shape.

63. (New): The electrically-conductive compression pad as claimed in claim 55 wherein said single sheet of electrically-conductive material is rectangular in shape.

64. (New): An electrolysis cell stack comprising:

a first electrolysis cell;

a second electrolysis cell, said second electrolysis cell being arranged in series with said first electrolysis cell; and

the electrically-conductive compression pad of claim 55 interposed between said first electrolysis cell and said second electrolysis cell.

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